Bonneville Power Administration
Fish and Wildlife Program FY99 Proposal

Section 1. General administrative information

Wind River Ecosystem Restoration

Bonneville project number, if an ongoing project 9154

Business name of agency, institution or organization requesting funding
Underwood Conservation District

Business acronym (if appropriate) UCD

Proposal contact person or principal investigator:

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Subcontractors.

Organization	Mailing Address	City, ST Zip	Contact Name
USDA Forest Service (USFS)	1262 Hemlock Road	Carson, WA 98610	Ken Wieman
Yakama Indian Nation-(In-kind funds contribution only) (YIN)	P.O. Box 151	Toppenish, WA 98948	Lee Carlson
USGS, Columbia River Research Laboratory (USGS)	5501-A Cook-Underwood Road	Cook, WA 98605	Patrick J. Connolly
USDI Fish and Wildlife Service, Fishery Program Office (USFWS)	9317 N.E. Highway 99, Suite I	Vancouver, WA 98665	Tim Cummings
Washington Dept. of Natural Resources (WDNR)	211 Hemlock Road	Carson, WA 98610	Susan Shaw
Washington Dept. of Fish and Wildlife	6 Cedar Lane	White Salmon, WA	Dan Rawding

(WDFW)			

NPPC Program Measure Number(s) which this project addresses.

2.2A, 2.2H, 3.2A, 4.3C, 5.9A, 7.1, 7.1C, 7.6C, 7.7, 7.8B

NMFS Biological Opinion Number(s) which this project addresses.

NA

Other planning document references.

Our watershed proposal is designed to preserve and restore the remaining run of steelhead to the Wind River subbasin while increasing our knowledge of the problems and needs of the watershed. Actions include establishing a watershed council and rehabilitating watershed health, water quality, channel morphology, and stream habitat. These actions address the factors for decline of wild stocks as listed in NMFS's Coastal Salmon Conservation: Working Guidelines for Comprehensive Salmon Restoration Initiative of the Pacific Coast, WDFW's Wild Salmonid Policy, State of Washington's Lower Columbia Steelhead Conservation Initiative, and the ISG's Return to the River. The actions proposed are consistent with the restoration actions identified in Wy-Kan-Ush-Mi Wa-Kish-Wit (Spirit of the Salmon), Endangered Species Act, Wild Salmonid Policy, Lower Columbia Steelhead Conservation Initiative, and the Record of Decision for the Northwest Forest Plan.

Subbasin.

Wind River subbasin

Short description.

Restore the ecosystem health of the Wind River subbassin with an immediate focus on recovery of steelhead production.

Section 2. Key words

Mark	Programmatic Categories	Mark	Activities	Mark	Project Types
X	Anadromous fish		Construction	*	Watershed
*	Resident fish		O & M	*	Biodiversity/genetics
	Wildlife		Production	*	Population dynamics
	Oceans/estuaries	*	Research	X	Ecosystems
	Climate	*	Monitoring/eval.		Flow/survival
	Other	X	Resource mgmt	*	Fish disease
			Planning/admin.		Supplementation
			Enforcement		Wildlife habitat en-
			Acquisitions		hancement/restoration

Other keywords.

Population dynamics, age and growth, education, steelhead, restoration, watershed council, life history, sampling, modeling, ecological interactions

Section 3. Relationships to other Bonneville projects

Project #	Project title/description	Nature of relationship

Section 4. Objectives, tasks and schedules

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	(Coordination) Expand membership of the Wind River Action Committee (AC) to form a watershed council with broad representation from stakeholder groups.	a	Facilitate meetings of the AC in order to develop group by-laws and draft a watershed management plan to outline the group's long term objectives. (FY 99-03)
2	(Coordination) Develop a technical working group to guide watershed council efforts by uniting existing membership of the Wind River Restoration Team (WRRT) and the Wind River Technical Advisory Committee (TAC).	a	Facilitate meetings of the technical working group to advise on technical aspects of the proposed project and to establish a liaison to the watershed council. (FY 99-03)
3	(Monitoring and Evaluation) Determine productivity and life history of juvenile steelhead in the Wind River subbasin.	a	Conduct sampling to derive a population estimate for steelhead parr and other salmonids. Surveys will focus on index reaches of Dry, Trapper, and Paradise creeks in the upper Wind River subbasin and the entire Trout Creek watershed. (FY 99-03)
4	(Monitoring and Evaluation) Determine smolt production and adult escapement in the Wind River subbasin.	a	Conduct sampling to derive annual estimates of production of steelhead smolts in the subbasin. (FY 99-03)
		b	Conduct sampling to derive annual

			estimates of adult returns of steelhead to the subbasin. (FY 99-03)
5	(Monitoring and Evaluation) Evaluate physical habitat conditions in the entire Wind River subbasin through surveying streams on private lands to augment on-going and already-funded surveys on USFS lands.	a	Conduct stream habitat and riparian surveys on 30 miles of stream within private lands in a manner compatible with existing USFS surveys. (FY 99-03)
		b	Evaluate spawning composition annually on four index spawning reaches. (FY 99-03)
		c	Monitor water quality (including temperature and nutrients) at 10 new and established sites to evaluate current conditions and change through time. (FY 99-03)
6	(Assessment) Assess watershed health using an ecosystem-based diagnostic model that will provide the technical basis to prioritize out-year restoration projects.	a	Identify goals and objectives for watershed assessment. (FY 99)
		b	Perform analysis and diagnosis to formulate restoration strategies with action alternatives. (FY 99-00)
7	(Restoration) Reduce road related sediment sources by reducing road densities to <2mi/sq.mi.	a	Decommission and restore 23 miles of road within sub-watersheds indentified in the Wind River Watershed Analysis: Upper Wind R. (5 miles in FY 99), Panther Creek (14 miles in FY 00-01), and Dry Creek (4 miles in FY 02-03) sub-watersheds.
8	(Restoration) Rehabilitate riparian corridors, flood plains & channel morphology on 5 stream miles to reduce maximum water temperatures (< 61 degrees F), to increase bank stability (> 90%) and to	a	Install log complexes to reduce bankfull width-to-depth ratios to < 30. [5 river miles (rm) in FY 99, 4 rm in FY 00, 2 rm in FY 01, 1 rm in FY 02 and 1 rm in FY 03]

	reduce bankfull width to depth ratios (< 30)		
		b	Place key pieces of LWD to promote recuitment of natural inputs of LWD and achieve the range of natural variability for the Wind River watershed (75-120 pieces/mile), 2 rm in FY 01, 3 rm in FY 02 and 2 rm in FY03.
		c	Plant and thin stands to to achieve stream shade to > 75% while establishing riparian conifers to > 15 trees over 31" in diameter per acre within the next 100 years. (10 acres in FY 99, 35 acres in FY 00, 10 acres in FY 01, 02 &03)
9	(Restoration) Maintain and evaluate passage for adult and juvenile steelhead at artificial barriers.	a	Maintain and evaluate passage over Hemlock Dam for adult and juvenile steelhead. (FY 99-01)
		b	Evaluate the removal or modification of Hemlock Dam. (FY 99-01)
		c	Evaluate culverts on the lower Wind River for potential fish migration barriers. (FY 99-03)
10	(Education) Promote watershed stewardship among youth by involving at least 80 students per year in environmental education programs in local schools.	a	Develop an EPA-based StreamWalk program in conjunction with Stevenson High School. (FY 99-00)
		b	Supply StreamWalk and Wind River Middle School's Junior Environmental Trouble Shooters (JETS) students with water quality monitoring tools and equipment, technical assistance, transportation to field sites, and review of curriculum results. (FY 99-03)
11	(Education) Raise community awareness of watershed issues by appending and	a	Design and install at least 10 signs to inform residents about watershed boundaries, protection

	implementation of the Wind River Watershed Interpretive Plan.		of resources, opportunities for involvement, and current restoration efforts. (FY 99-03)
		b	Design brochures to be included with Skamania County PUD mailings describing the watershed restoration effort and opportunities for involvement. (FY 99-03)
		c	Organize two community volunteer events per year (e.g., tree planting, fish viewing, fish education days, river clean-ups) to inform the public about watershed impacts and restoration strategies. (FY 99-03)
12	(Education) Provide technical assistance to promote watershed stewardship to at least 75 landowners in the watershed.	a	Host stewardship technical workshops for landowners in cooperation with the Cooperative Extension of Washington State University. (FY 99-03)
		b	Develop stewardship plans with landowners using WDNR and NRCS format. (FY 99-03)

Objective schedules and costs

Objective #	Start Date mm/yyyy	End Date mm/yyyy	Cost %
1	10/1998	9/2003	2.00%
2	10/1998	9/2003	2.00%
3	10/1998	9/2003	24.00%
4	10/1998	9/2003	20.00%
5	10/1998	9/2003	9.00%
6	2/1999	9/2000	5.00%
7	10/1998	9/2003	7.00%
8	10/1998	9/2003	16.00%
9	10/1998	9/2003	8.00%
10	10/1998	9/2003	3.00%
11	10/1998	9/2003	3.00%
12	10/1998	9/2003	1.00%
			TOTAL 100.00%

Schedule constraints.

Potential constraints include: 1) obtaining sampling permits, and 2) obtaining permission to access private lands.

Completion date.
FY 2003

Section 5. Budget

FY99 budget by line item

Item	Note	FY99
Personnel	FY 99 in-kind contributions = $87,679	$242,083
Fringe benefits	FY 99 in-kind contributions = $21,904	$80,694
Supplies, materials, non-expendable property	FY 99 in-kind contributions = $17,390	$41,460
Operations & maintenance	In addition, 7% of the above personnel costs are for O&M	$10,400
Capital acquisitions or improvements (e.g. land, buildings, major equip.)	FY 99 in-kind contributions = $34,000	$37,000
PIT tags	# of tags: 0	$ 0
Travel	FY 99 in-kind contributions = $13,403	$8,570
Indirect costs		$120,567
Subcontracts	FY 99 in-kind contributions = $236,019	$128,375
Other	Totals FY 99: In-kind contributions = $410,395; Requested from BPA = $669,149	$ 0
TOTAL		$669,149

Outyear costs

Outyear costs	FY2000	FY01	FY02	FY03
Total budget	$620,130	$652,224	$684,772	$717,847
O&M as % of total	8.00%	9.00%	9.00%	11.00%

Section 6. Abstract

The quality and quantity of salmonid habitat in the Wind River subbasin has been reduced by Bonneville Dam's inundation of the lower two miles of river along with timber harvest, road building, and other land use activities within the watershed. In 1992, the American Fisheries Society rated summer and winter steelhead as a moderate and high risk of extinction, respectively, and they listed the Wind River sea-run cutthroat trout

as extinct. In 1997 WDFW rated the Wind River summer run steelhead as critical. Due to the status of this stock, the Wind River summer steelhead have the highest priority for restoration in the State of Washington's Lower Columbia Steelhead Conservation Initiative.

The proposed projects are a joint product of public and private stakeholders. The goal of these projects is to preserve, protect, and restore the Wind River steelhead and its habitat. This goal will be achieved by utilizing a holistic, community-based watershed restoration approach. Proposed restoration efforts will address known degraded streams, riparian, and up-land areas. An adaptive management strategy will build upon past successes in restoring degraded water quality and habitat within the Wind River subbasin. The collection of biological, physical habitat, and water quality data will fill critical gaps on private and public lands necessary to assess the overall condition of the watershed and prioritize future restoration efforts. Coordination and education of land owners, the community, and other stakeholders will be an important part of achieving our goal.

Section 7. Project description

a. Technical and/or scientific background.

Most populations of salmonids which historically occupied the Wind River watershed are considered depressed (WDF et al. 1993). According to a report by the American Fisheries Society, the Wind River winter steelhead are at high risk for extinction, the summer steelhead are at a moderate risk for extinction, and the Wind River sea-run cutthroat are extinct (Nehlsen et al. 1991). Because Shipherd Falls, which is 4.3 miles upstream from the historic mouth of the Wind River, was a natural barrier to all anadromous fish except steelhead (Bryant 1949), summer steelhead were dominant and numerous above this barrier. USFWS (1951) estimated summer steelhead run size was 3,250 with an escapement of 2,500 spawners. The current number of wild summer steelhead spawning in the Wind River subbasin has been reduced to approximately 100 adults in recent years (Rawding 1997). In addition, a fall race of chinook that dominated the lower reach of the Wind River is depressed and composed of a substantial number of stray hatchery fish (WDF et al 1993).

Anadromous fish losses have been attributed to the construction of Bonneville Dam, timber harvest, and rural development of the upper watershed (WDW et al. 1990). These activities in the upper watershed have severely impacted riparian areas and stream channels in several key steelhead subbasins evidenced by maximum water temperatures exceeding 75 degrees F, risk of increased peak flows, and increased sedimentation (USFS 1995). There is also concern of the ecological and genetic risks posed by the anadromous hatchery programs (NMFS 1996). Carson National Fish Hatchery was constructed in 1938 to mitigate for the construction of Bonneville Dam and currently produces 1.8 million spring chinook smolts. A fish ladder at Shipherd Falls was constructed to allow salmon access to the hatchery at river mile 18. Hatchery steelhead smolts have been

released in the basin since the 1960's and the current release is between 20,000 and 40,000 fish.

Based on the 1992 Trout Creek watershed assessment, several habitat restoration projects were initiated in 1994. The USFS completed a watershed analysis for the Wind River in 1995, which identified stream reaches that posed a high risk to the long term survival of steelhead (USFS 1995). These efforts have resulted in the development of bio-technical methods to improve steelhead habitat by stabilizing stream banks, improving channel complexity, reconnecting flood plains, and rebuilding riparian areas (Bair 1997). Adult fish passage problems at Hemlock Dam identified by Orsborn et al. (1987) were partially corrected in 1996 by increasing adult attraction flow at the ladder entrance and eliminating false attraction flow from the Wind River Nursery. Issues concerning juvenile passage at this facility remain unresolved.

The Wind River Restoration Team (WRRT) was formed in 1994 in response to the decline of steelhead within the Wind River subbasin. The team includes technical specialists from the. UCD, USFWS, WDFW, USGS (formerly National Biological Service), Washington Trout (WT) and the Yakama Indian Nation (YIN). Based on the watershed analysis (USFS 1995) and the work by Connolly (1995), which summarized know information on Wind River summer steelhead, the WRRT has funded and completed the restoration projects mentioned above. The recent sharp decline in wild steelhead adults requires that restoration activities be accelerated but the lack of WRRT funding for FY98 makes it unlikely that high priority projects can be implemented. The WRRT has forwarded this holistic, community-based watershed approach to restore steelhead and their habitat. An adaptive management strategy will build upon past successes, and the collection of biological, physical, and water quality data will fill critical gaps to assess overall watershed condition and prioritize future restoration.

This proposal incorporates both public and private lands recognizing that "limiting restoration to public lands would be biologically futile and wasteful of public funds" (NPPC 1994). This holistic watershed approach is also recommended by the ISG (1996). The Columbia Basin Fish and Wildlife Program (NPPC 1994) identified that salmonid restoration is linked to identification of key uncertainties and variables that limit populations. We have proposed to link the steelhead's life history diversity, capacity, and productivity to address this issue.

Protection of wild steelhead and their habitat is the goal of the Endangered Species Act (ESA, NMFS 1996), Wild Salmonid Policy of WDFW (1997), the tribal restoration plan (WY-KAN-USH-MI WA-KISH-WIT, Nez Perce Tribe et al. 1996), and the Northwest Forest Plan (USFS and BLM 1994). Wind River steelhead are proposed to be listed as threatened under the ESA on February 9, 1998. In addition, Wind River summer steelhead have received the highest priority for restoration under the State of Washington's steelhead recovery plan – the Lower Columbia Steelhead Conservation Initiative (WDFW et al. 1997). Funding of this proposal would be a timely way of addressing concerns about declining status of steelhead in the lower Columbia River basin.

The information from this proposed study will: 1) directly and immediately help the planning efforts of the proposed Wind River Watershed Council, and 2) fill gaps in implementation of measures of the Fish and Wildlife Program that have received little

attention to date. The Wind River represents a unique watershed in the Columbia Basin: above Bonneville Dam but with anadromous fish stocks of coastal lineage. Our results can be incorporated to help rebuild other coastal stocks, such as those in small tributaries between Bonneville Dam and the Hood River. Results may also be useful for planned efforts to reintroduce anadromous fish into the White Salmon River above Condit Dam.

Our proposed projects are consistent with the plans and priorities of stakeholders, along with state, federal, and tribal agencies. We propose to preserve and protect the remaining run of steelhead by rehabilitating watershed health, water quality, channel morphology and habitat; by monitoring populations and production of steelhead; and by increasing our knowledge of the problems and needs of the watershed. Successful restoration projects require public involvement, and we have established a public education and involvement process through the formation of a local watershed council. The decline of steelhead returning to the Wind River, the potential reasons for this decline, and the recovery of these steelhead in this watershed exemplify a spectrum of problems and activities that the Fish and Wildlife Program (FWP) was designed to address.

b. Proposal objectives.

1. Form a Wind River watershed council by expanding current Action Committee (AC) membership. The group will: 1) produce a comprehensive watershed management plan and plan-of-work document based on assessment; 2) facilitate communication between land-use interests and enable access for on-the-ground projects; 3) leverage resources for acquiring supplemental funding; and 4) provide a conduit for information to the community as a whole.
2. Develop and support a single technical working group by combining members of the WRRT and TAC to guide restoration efforts of the watershed council. The technical group will work on watershed assessment and oversee the implementation and progress of the project.
3. Estimate populations and densities of steelhead parr. We will use these data and auxiliary data to evaluate trends in instream populations and life history aspects such as year-to-year survival and growth.
4. Estimate smolt production and adult returns of steelhead. We will use these data and auxiliary data to evaluate trends in populations and life history aspects such as age at smolting, age at return, survival, and growth.
5. Evaluate physical habitat conditions in the entire Wind River subbasin by surveying streams on private lands to augment on-going surveys on USFS lands. Tasks call for surveying 30 miles of stream to evaluate stream habitat and riparian conditions; evaluating four index sites for spawning gravel composition; and monitoring water quality conditions at 10 sites.
6. Assess the health of the Wind River watershed on both private and public lands using the Ecosystem Diagnostic Treatment (EDT) model to provide the technical basis for prioritizing future restoration projects in the Wind River. An analysis and diagnosis will

be completed to formulate long-term restoration goals and objectives along with strategies and action alternatives.
7. Reduce road related sediment sources by reducing road densities to <2mi/mi^2.
8. Rehabilitate riparian corridors on 6.4 stream miles (5 river miles in FY99) to meet existing state water quality standards and reduce maximum water temperatures (< 61 degress F), to increase bank stability (>90%), and to reduce bankfull width-to-depth ratios (<30). Accomplish by installing bio-engineered structures on degraded streambanks and by restoring riparian vegetation over a five-year period.
9. Maintain passage of adult and juvenile steelhead over Hemlock Dam and through culverts. We propose to evaluate the removal or modification of Hemlock Dam to provide safe and timely fish passage.
10. Promote watershed stewardship among youth by involving at least 80 local students per year in environmental education programs. Program activities are designed to: 1) provide middle and high school students with the opportunity to explore water quality and related riparian issues using a field approach, 2) incorporate student's work to a current watershed restoration effort, 3) coordinate student's work to a broadened understanding of the entire Columbia River system, and 4) coordinate with other schools and government agencies.
11. Develop a Wind River Watershed Interpretive Plan to guide implementing community outreach projects. Install 10 signs, distribute at least 500 brochures, and organize 2 community volunteer events per year.
12. Provide technical assistance to promote watershed stewardship to at least 75 landowners in the watershed. Assist in conducting at least two workshops and developing five stewardship plans per year.

Expected Products :
1) One draft watershed management plan developed by a watershed council (FY 99)
2) Annual reports including sections on each objective described above (FY 99-03)
3) One watershed assessment report (FY 00)
4) One road decommissioning project (5 mi. in FY 99, 18 miles in FY 00-03)
5) Four technical description of bio-technical methods developed for bank and channel rehabilitation
6) Ten interpretive signs designed, constructed, and installed (FY 99-00)
7) Two community events (annually)
8) Five hundred brochure mailers to resident landowners (annually)
9) One watershed stewardship curriculum with development of five plans (FY 99)
10) Two peer-reviewed publications (FY 01-03)
11) Two professional meeting presentations (FY 01, 02)
12) Fourteen community presentations or meetings (annually FY 99-03)

Benefits to FWP:

The proposed projects will mesh restoration, research, and monitoring efforts that are specifically designed to enhance watershed health, improve water quality, and rebuild wild steelhead runs in the Wind River watershed. A recent decline of wild steelhead returning to the Wind River warrants a strong response to ensure an expedient restoration

to this once heralded run to both tribal and sport fisheries. We wish to emphasize that the types of restoration efforts and information we seek are directly synchronous with goals and measures of the Council's Fish and Wildlife Program (NPPC 1994), the concepts presented in "Return to the River" (ISG 1996), and in the "Wy-Kan-Ush-Mi Wa-Kish-Wit" (Nez Perce et al. 1996).

c. Rationale and significance to Regional Programs.

The NPPC (section 7.6C of the Fish and Wildlife Program, e.g.) and the ISG (1996) have recommended a holistic, watershed approach to be used to identify key physical and biological limitations for the recovery of salmon and steelhead stocks. The activities we have proposed for the Wind River watershed would meet the FWP goals through interagency cooperation along with public participation. We have proposed an on-the-ground, multi-faceted, and broad-scale restoration project. We have proposed activities that will provide specific information to the Wind River Restoration Team for their efforts to restore steelhead to the subbasin, and will provide managers with the data needed to make informed decisions about additional efforts that will help to restore the Wind River ecosystem. By involving the community through participation in committees and in on-the-ground restoration activities, we hope to foster a healthy stewardship that will last for generations to come.

Measure 7.6C of the FWP recognizes the value of the collaborative efforts of the Wind River Restoration Team operating within a local watershed. Measure 7.6C also stresses the importance of landowner and community participation in restoration activities. This is being addressed through the development of a watershed council through which all stakeholders, including public and private entities, will be able to work toward restoration activities in concert. Restoration activities proposed address Measure 7.7 of the FWP. Because of the concern for health of steelhead in the lower Columbia, the need for the type of data sought, and the location of the Wind River (above Bonneville Dam but within the lower Columbia River system), we believe that funding of the proposed projects would yield highly valuable results.

Life history diversity may be an important factor in the persistence of steelhead in the Wind River subbasin. These investigations would address measures 2.2A, 5.9A, 7.1, 7.1C, and 7.8B of the Fish and Wildlife Program. It is recognized that "Implementation shall incorporate a high level of public involvement and collaboration with constituents that have a high interest or stake in the outcome of [wild salmonid conservation] actions..." (WDFW 1997). A Wind River watershed group will be the venue for community involvement and overall project guidance. Recent efforts by UCD, Skamania County, and USFWS have established a diverse 27 member stakeholder group (Wind River Action Committee) of watershed interests, including community and agency representatives. This USFWS-funded effort is limited in scope, focused on implementation of two "demonstration" on-the-ground restoration projects on private or state lands, intended to illustrate the benefits of watershed partnerships. Funding under this proposal will allow the Wind River Action Committee to take the next logical step,

establishing themselves as a permanent advisory body to be involved in all aspects of the proposed project.

d. Project history

Not applicable: this is a new project.

e. Methods.

1. Coordination of the various interest groups will follow coordinated resource management planning methodology. The watershed council will be modeled after similar, local councils, including the White Salmon Watershed Management Committee and the Grande Ronde Model Watershed effort. The group will generally follow guidelines prescribed for in the "Management of Non-Point Source Pollution" handbook (Puget Sound Water Quality Authority, 1989).

2. Technical working group members will devise strategies to meet Wind River watershed management plan objectives. The group will employ Best Management Practices and progressive solutions to identified problems.

3. We propose to produce annual estimates of density of juvenile and resident salmonids, with the primary emphasis on steelhead, for index reaches within at least three streams in the upper Wind River subbasin (Dry, Trapper, and Paradise creeks) and for the portion of the Trout Creek watershed that is accessible to steelhead and above the smolt trapping site. We will compare these estimates to past estimates that are available, such as those from 1984 (Crawford et al. 1985), 1996 (Connolly 1997), and 1997 (Connolly and Hanten in prep.). To obtain estimates of fish density, we will first conduct intensive habitat surveys of sampling sites during summer low-flow conditions. Soon after these habitat surveys, fish surveys will be conducted either by snorkeling (for stream sizes greater than third order) or electrofishing (for stream sizes less than or equal to third order). When we conduct snorkel surveys, we will largely follow the methodology of Hankin and Reeves (1988), which utilizes a stratified systematic surveying technique to sample and derive an estimate of fish density. To calibrate snorkel estimates by the ratio method as detailed in Dolloff et al. (1993), we will coordinate the time of our snorkel sampling with the time, place, and intensity of any electrofish sampling so that minimal additional electrofishing will be required. For small stream reaches that can not be snorkeled, we will electrofish a systematic sample of habitat units within strata of habitat types (e.g., pools, glides, riffles). When electrofishing is used, habitat units chosen for sampling will be blocked off with nets to insure no movement into or out of the unit during sampling. A backpack electrofisher will be used to conduct two or more passes under the removal-depletion methodology (Zippin 1956, Bohlin et al. 1982, White et al. 1982). The field guides of Connolly (1996) will be used to insure a controlled level of precision in the population estimate is achieved within each sampling unit for each

salmonid species (expected: steelhead/rainbow trout, brook trout) and age group (expected: two-three groups). These methods have been chosen to specifically insure maximum conservancy in the number of units sampled by electrofishing and in the number of electrofishing passes conducted, which lessen the chance that individual fish will be exposed to potentially harmful effects of electroshocking.

4. Under Task a, we propose to develop annual estimates of smolt production from the Wind River subbasin. Proposed trap sites will be located to estimate total basin production (mouth of Wind River) and production from key watersheds (Trout Creek, Panther Creek, and Upper Wind River). Rotary screw traps will be fished from March 15 to June 15, which coincides with Wind River smolt migration (Rawding in prep). Traps will be checked daily and fish will be enumerated. After fish are anesthetized, we will obtain fork lengths and weights from all fish and scale samples will be obtained from up to 10 fish daily. Ages from these fish will be used in conjunction with fork-length frequencies to determined age composition for the smolt outmigration.

Smolt estimates will be determined by the trap efficiency method of releasing marked fish upstream of each trap (Thedinga et al. 1994). All fish will be tattooed and marks will be rotated weekly to determine changes in trap efficiency. Trap efficiency will be determined by Bailey's (1951) modification of the Petersen estimator. Short-term survival and mark retention will be measured and used to adjust trap efficiency (Murphy et al. 1996). Confidence intervals will be determined using a bootstrap method (Efron and Tibshirani 1986).

Under Task b, we propose to assess the annual adult steelhead returns to the Wind River subbasin. Currently, expanded redd surveys are used to develop adult escapement estimates based on assumptions on differences in winter and summer steelhead distribution and differences in hatchery and wild spawning time. Knudsen (1997) rated these methods as fair to poor for determining escapement estimates. Therefore, we propose to reinstall an adult trap in the Shiperd Falls fish ladder to improve the accuracy of adult escapement estimates. We propose to operate the adult trap year round. Adult steelhead will be floy tagged and released upstream. Since summer steelhead can successfully jump the falls, snorkel surveys and the Trout Creek trap will be used to determine the total number of tagged and untagged fish. Adult run size will be estimated using Baily's (1951) modification to the Peterson estimator. Floy tag loss will be estimated through the use of double marking. In addition to receiving a floy tag, a small hole will be placed in the caudal fin with a paper punch. As fish are recaptured upstream at the Trout Creek trap floy tag loss will be estimated. In addition, caudal fin tissue will be taken with a paper punch, and the sample will be archived for future genetic analysis (DNA).

5. Stream habitat and riparian surveys will follow the USFS Region 6 Stream Inventory Handbook guidelines for Level 2 surveys. In general, this survey will quantify key habitat types (i.e. pools, riffles), key habitat features (i.e. LWD, substrate) and classify channel types according to Rosgen (1994). Riparian surveys will distinguish vegetation into major plant association types and seral stage. We propose to estimate spawning gravel composition within four index spawning reaches using methods described by the Yakima River Resource Management. Using this standardized process, sample cores from spawning gravel will be collected with a McNeil core sampler and

subsequently analyzed in a lab to determine substrate composition including percent fines. Impacts to egg survival will be estimated using methods described by Young et al. (1991).

Water quality monitoring will be conducted at 10 new stations located primarily on private lands. These stations will augment existing stations on National Forest land. Monitoring will consist of an initial assessment in the first year, consisting of four quarterly sampling rounds and two flush flow sampling rounds. One flush flow and one base flow sampling round will occur each year for the next four years to monitor change over time. Parameters to be sampled include pH, turbidity, dissolved oxygen, conductivity, continuous temperature, nitrate and nitrite nitrogen, phosphorous, and total and fecal coliform bacteria. Water quality monitoring program will be devised according to DOE QA/QC plan criteria.

6. To accomplish this objective, data from fish (Obj. 3 and 4) and physical habitat (Obj. 5) assessments will be combined with existing data to help assess the health of the Wind River subbasin. Substantial information on habitat conditions are available in the USFS's (1995) Wind River Watershed Analysis but most of the data and analysis is concerned with USFS lands. The Wind River Watershed Analysis could be improved by incorporating a theoretical basis for analyzing how these processes affect populations such as summer steelhead, by examining cumulative effects of environmental factors on steelhead, and by adding additional information from off forest lands. We propose to use the EDT model following Mobrand et al. (1995) and Lestelle et al. (1996) to link environmental factors with population biology by using life-history diversity, capacity, and productivity information to provide more certainty in the analysis and outcomes of proposed restoration activities to help rebuild the Wind River summer steelhead population.

7. Under task a, road obliteration will be accomplished in accordance with the USFS's (1996) Forest Service Technology and Development manual. Twenty-three miles of road will be decommissioned over the next five years. Work will be conducted in accordance with the State of Washington Hydraulic Permit Approval. Erosion control prescriptions will follow best management practices using native or non-invasive grass seed and shrubs along with natural filter netting. Culvert sites will be fitted with erosion control mat, grass seed and shrubs. Roads will be seeded with non-invasive or native grass seed and native trees and shrubs. Photo points and vegetative growth/survival plots will be established to monitor rehabilitation. Road decommissioning projects are expected to reduce risk of mass failure/landslides, reduce road related sediment sources, and restore natural water routing and reduce run-off.

8. Under Task a, bank stability will be increased along a total of 6.4 river miles of stream within public and private portions of the Wind River watershed over the next 3 years: LWD and soil bio-engineering stabilization methods developed during the 1994-1996 Trout Creek Restoration (Bair 1997) project will be used to revet banks. In addition to lower bank treatments, shrubs and conifers will be planted on upper banks to increase bank root densities. Fish and other aquatic vertebrates will be removed with seines and electrofishing prior to in-stream activities. Environmental analysis of cultural resources, sensitive plants and animals will be conducted prior to restoration. In addition, work will be conducted in accordance within the standards of both US Army Corps of Engineers

and State of Washington Hydraulic Permits. Photo points, permanent cross sections and thalweg profiles will be established and monitored for at least four sites after treatment. The tasks associated with this objective are expected to reduce bank related sediment, help reduce width-to-depth ratios, increase pool quality and quantity, increase nutrient retention, increase fish hiding cover and increase stream shade.

Under Task b, instream LWD will be increased (FY 01-03) in 7 river miles to within the range of natural variability (75 -120 pieces of LWD/mile depending on channel type) documented in the USFS's (1995) Wind River Watershed Analysis. LWD will be placed within the bankfull channel to supplement LWD levels until riparian stands are old enough to contribute wood into the channel. LWD supplementation is expected to store sediment, dissipate water velocity, and restore habitat complexity. LWD reintroduced into channels will not be secured with cable or other means. However, placement of wood will be within reaches of stream that do not pose a significant threat to bridges, roads or structures. LWD will be photographed, tagged and mapped.

All work proposed under this objective will be preceded by an environmental analysis. All work will be conducted in accordance to the standards of both US Army Corps of Engineers and State of Washington Hydraulic Permits.

Task c proposes to: 1) thin 10 acres (FY 99) of overstocked, homogeneous stands of hardwoods and Douglas fir to release native conifers such as cedar, hemlock and grand fir, and 2) under-plant 10 acres (FY 99) of stands with native conifers. Environmental analysis will follow EPA and NEPA standards. Plant survival and growth plots will be established and monitored for four years after treatment. A solar path finder will be used to evaluate the percentage of stream shaded during the months of June, July, August and September. Riparian rehabilitation will accelerate growth rates and diversify stream side vegetation which increases potential LWD, bank stability, and stream shade. Restoration of riparian areas will provide a long-term, self-sustaining aquatic ecosystem.

9. Under Task a, we propose to release radio-tagged juvenile steelhead upstream of the Hemlock Reservoir and monitor the timing and route of passage through the reservoir as described by Wieman and Adams (in progress). A system of four aerial antennas will monitor smolt progress through the 16 acre forebay. Five underwater receivers will locate the points of passage over the dam and associated fish ladder. Mobile tracking will be use to monitor downstream passage to the mouth of the Wind River. It is proposed to incorporate ongoing mainstem Columbia River telemetry efforts to determine passage over Bonneville Dam. Adult steelhead passage conditions at Hemlock Dam will be monitored using three, stage level indicators. Levels located in the fish ladder and spillway will be used to estimate attraction flow and discharge in the fish ladder. Monitoring and maintenance of appropriate water conditions in the fish bypass is expected to improve upstream steelhead migration and ensure compliance with instream water rights. Additionally, we propose to install an automated fish counter or underwater video. This task will be initiated by first completing a technical feasibility study in 1999 followed by the installation and operation of the surveillance device (00-03). This monitoring effort is expected to reveal if the adult bypass effectively attracts fish and passes them over the dam in a safe and efficient manner. Lastly, we will maintain the existing fish trap located at the ladder. This monitoring tool will allow us to enumerate

adult steelhead (see Obj. 3, Task c), and it will enable us to collect biological information and inspect fish for bodily injury.
Under Task b: We propose to contract an engineering firm to develop two or more alternatives and associated cost assessment for modify or removing Hemlock Dam. Specific issues to be addressed in the feasibility study will include: volume of sediment and disposal methods, impacts to downstream users, impacts to fish and wildlife, and restoration strategies.
Under Task c: We proposed to conduct a field assessment of road crossing to determine if conditions exist that may restrict fish passage. In accordance with Washington Trout's (WT) instructional manual, "Culvert College" and established methods of Washington Department of Transportation, we will measure relevant data including but not limited to: 1) flow approach conditions 2) culvert internal conditions, 3) downstream conditions and 4) design flow.

10. The Stevenson High School and Wind River Middle School programs are based on the EPA StreamWalk model. Successful USFS programs, including "Fashion A Fish" and "Senior Challenge" activities, will be incorporated into the programs. StreamWalk consists of classroom study, water quality monitoring, and assessment of land-use impacts. An end-of-term report prepared by each student will be reviewed by teachers and UCD for evaluation of curriculum effectiveness.

11. A Wind River Watershed Interpretive Plan will be developed according to USFS format. Planned products include watershed delineation signs, watershed informational signs, brochures, and community volunteer events. Tree planting events will utilize conifers from UCD Tree Sales Program and will target degraded private riparian areas. River clean-ups will follow the Washington Water Weeks and White Salmon Trash Rodeo models. Fish viewing events will be conducted to let people see fish in their natural environment. Fish Education Days will utilize agency personnel and build from established local models. Schools, environmental groups, service organizations, and the general public will be targeted for participation. An interpretive plan will insure that such actions are carried out with community support and in accordance with agency standards.

12. Stewardship workshops that may be conducted include the L.E.A.P. program for local loggers, Master Watershed Steward course, Coached Forest Stewardship Plan Writing Course, and Forest Stand Management workshop. Assistance will be provided to landowners preparing stewardship plans using WDNR's SIP format and the NRCS's Resource Management System format.

f. Facilities and equipment.

The UCD's offices in White Salmon (WA), USFS's Wind River Ranger District at Stabler (WA), USGS's facility at Cook (WA), and WDFW's offices in North Bonneville (WA) are all well equipped with the modern office equipment necessary to conduct complex data analyses and prepare professional documents.

Special or higher-cost equipment to be purchased with project funds include:

one GPS unit - $700; one backpack electrofishers with probes and batteries - $4,600; two computers - $6,000; one adult trap - $20,000, and one smolt trap (rotary screw-type) - $17,000.

g. References.

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Connolly, P.J. 1995. Wind River steelhead restoration project: with special emphasis on the Trout Creek Basin. Prepared for: Columbia River Research Laboratory, National Biological Service, Cook, WA.

Connolly, P.J. 1996. Resident cutthroat trout in the central Coast Range of Oregon: logging effects, habitat associations, and sampling protocols. Doctoral dissertation. Oregon State University, Corvallis.

Connolly, P.J. 1997. Status of juvenile steelhead rearing in Trout and Panther creeks of the Wind River Basin. Prepared for: Washington Trout, Duvall, WA.

Crawford, B.A., R. Pettit, and R. Claflin. 1985. Study of juvenile steelhead densities and biomass in the Wind and E.F. Lewis rivers. Washington Department of Game, Olympia.

Dolloff, C.A., D.G. Hankin, and G.H. Reeves. 1993. Basinwide estimates of habitat and fish populations in streams. General Technical Report SE-83. Asheville, North

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Mobrand, L., and L. Lestelle. 1997. Application of the ecosystem diagnosis and treatment method to the Grande Ronde model watershed project. Final Report. Prepared for: Bonneville Power Administration, Project No. 94AM33243.

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Section 8. Relationships to other projects

Results from this proposed project should be useful to many ongoing and future restoration projects.

This project is a collaborative effort between UCD, WDFW, USFS, USGS, USFWS, and YIN. Key personnel within these groups have an established working relationships through the Wind River Restoration Team.

Section 9. Key personnel

Name	Employer	Title	Hours to be funded

Thomas Brian Bair	USFS	Project Fishery Biologist	904

Duties: Habitat surveys and restoration, watershed health assessment.

Lee C. Carlson	YIN	USFS/Tribal Liaison Biologist	0 (all in-kind)

Duties: Monitoring of spawning bed sediment

Patrick J. Connolly	USGS	Research Fishery Biologist	2,008

Duties: Monitoring of steelhead parr populations, watershed health assessment.

Tim R. Cummings	USFWS	Fishery Management Biologist	160

Duties: Smolt monitoring

J. Gardner Johnston	UCD	Watershed Coordinator	1,496

Duties: Formation of a Watershed Council, Community involvement.

James H. Petersen	USGS	Research Fishery Biologist	160

Duties: Watershed health assessment

Daniel J. Rawding	WDFW	Fish Biologist	384

Duties: Monitoring of smolt and adult populations, watershed health assessment.

Susan C. Shaw	WDNR	Watershed Analysis Prg. Mngr.	240

Duties: Watershed health assessment.

Steve Stampfli	UCD	Manager	440

Duties: Project management, formation of Watershed Council, community education activities.

Ken Wieman	USFS	Fisheries Program Manager	816

Duties: Habitat surveys and restoration, watershed health assessment, monitoring of spawning bed sediment.

Resumes of these key personnel follow.

Resume for: Thomas Brian Bair

Experience

1992-Present	Project Fishery Biologist, USDA Forest Service, Wind River Ranger District, Carson, WA. Current Responsibilities: Analyze, plan, design, coordinate and implement instream and riparian restoration projects on the South Zone of the Gifford Pinchot National Forest.
1991-1992	Assistant District Fishery Biologist, Wind River Ranger District, Carson, WA.
1990-1991	Fishery Technician, Flathead National Forest, Kalispell, MT.
1989-1990	Assistant Packer/Fishing Guide, Yellowstone Mountain Guides, Belgrade, MT.
1986-1988	Forest Technician, North Fork Land Corporation, Big Sky, MT.

Education:	School	Degree and Date Received
	Montana State University	B.S. Biology, 1990

Expertise: My expertise and focus for the last five years has been on stream channel and riparian restoration. I have been responsible for the analysis, planning, design, partner coordination, budget, contract writing/administration, implementation and monitoring on the South Zone of the Gifford Pinchot National Forest. During the past five years, I have completed and am currently working on large scale watershed restoration projects totaling $1.26 million dollars. I have designed and implemented the following types of restoration projects: road obliteration, riparian rehabilitation (planting and thinning), land slide rehabilitation, and channel/flood plain restoration.

Publications and Reports (five most relevant)

Bair, T.B. 1992. Wind River Ranger District 1992 Anadromous Fish Basin Assessment. USDA, Forest Service, Gifford Pinchot National Forest.

Bair, T.B. 1993. Little Soda Springs Restoration Completion Report. USDA Forest Service, Gifford Pinchot National Forest, Wind River Ranger District.

Bair, T.B. 1994. Trout Creek Channel Restoration Analysis/Plan. USDA, Forest Service, Gifford Pinchot National Forest, Wind River Ranger District.

USDA, Forest Service. 1995. Wind River Watershed Analysis. Gifford Pinchot National Forest, Wind River Ranger District. T.B. Bair, principal investigator/author of fisheries, stream channel, and riparian vegetation analysis.

Bair, T.B. 1996. Trout Creek Restoration Monitoring/Completion Report. USDA, Forest Service, Gifford Pinchot National Forest, Wind River Ranger District.

Resume for: Lee C. Carlson

Experience

1991-Present USFS/Tribal Liaison Biologist, Fishery Resource Management Program, Confederated Tribes and Bands, Yakama Indian Nation, Toppenish, WA.

Current responsibilities: Tribal Fisheries program liaison to Gifford Pinchot, Wenatchee, and Okanogan National Forests (YIN Ceded Area).

1979-1991 Fishery Biologist, Assistant Fishery Director, Resource Manager; Pyramid Lake Paiute Tribe, Nixon, NV.

1973-1977 U.S. Army

Education:	School	Degree and Date Received
	Colorado State University Fort Collins, CO	B.S. Biology, 1973
	Colorado State University Fort Collins, CO	2nd B.S. Fisheries Biology, 1978

Expertise: My primary areas of expertise include salmonid and catastomid culture and habitat protection. I have conducted water quality monitoring studies in a lake environment, creel census, and lotic fish population sampling. I have advocated for tribal treaty rights since 1979 and have become versed in the NEPA and FACA processes, especially through participation in the Eastern Washington Cascades, Yakima, and Southwest Washington Provincial Advisory Committees.

Resume for: Patrick J. Connolly

Experience

1997-Present	Research Fishery Biologist, U.S. Geological Survey, Biological Resources Division, Columbia River Research Laboratory, Cook, WA. Current responsibilities: Team leader on research project to determine survival of summer steelhead over their first winter in the Wind River Basin (WA).
1994-1997	Consultant to Wind River Restoration Team, WA.
1990-1996	Research Assistant, Oregon State University, Corvallis.
1988-1991	Fish Biologist--Subbasin Planner, Oregon Dept. Fish & Wildlife, Corvallis.
1987-1988	Fish Biologist--Research, Oregon Dept. Fish & Wildlife, Columbia River Research, Clackamas, OR.
1985-1987	Fish Biologist, Beak Consultants Inc., Portland, OR.
1984-1985	Fishery Biologist, U.S. Fish and Wildlife Service, National Fisheries Research Center, Columbia River Field Station, Cook, WA.
1983	Fish Habitat Surveyor, Idaho Transportation Dept., Coeur d'Alene, ID.

Education:	School	Degree and Date Received
	Oregon State University, Corvallis	Ph.D. Fisheries Science, 1996
	University of Idaho, Moscow	M.S. Zoology, 1983
	Centre College of Kentucky, Danville	B.S. Biology, 1977

Expertise: The primary areas of my expertise include stream fish ecology and population dynamics. I have contributed to numerous studies involving anadromous and resident salmonids as well as non-salmonids of the Pacific Northwest.

Publications and Reports (five most relevant)

Connolly, P.J. 1997. Influence of stream characteristics and age-class interactions on populations of coastal cutthroat trout. Pages 173-174 *in* J.D. Hall, P.A. Bisson, and R.E. Gresswell, editors. Sea-run cutthroat trout: biology, management, and future conservation. Oregon Chapter, American Fisheries Society, Corvallis.

Connolly, P.J. 1997. Status of juvenile steelhead rearing in Trout and Panther creeks of the Wind River Basin. Prepared for: Washington Trout, Duvall, WA.

Connolly, P.J. 1996. Resident cutthroat trout in the central Coast Range of Oregon: logging effects, habitat associations, and sampling protocols. Doctoral thesis, Oregon State University, Corvallis.

Connolly, P.J. 1995. Wind River steelhead restoration project: with special emphasis on the Trout Creek Basin. Prepared for: Columbia River Research Laboratory, National Biological Service, Cook, WA.

Connolly, P.J. et al. 1992. Fish management plan for the Middle Fork Willamette Subbasin. Oregon Department of Fish and Wildlife, Portland.

Resume for: Timothy R. Cummings

Experience

1989-Present Fishery Management Biologist, U.S. Fish and Wildlife Service, Columbia River Fisheries Program Office, Vancouver, WA.
Current responsibilities: Service representative on Wind River Restoration Team and ESA review for Bull Trout.

1988-1989 Fishery Biologist, U.S. Fish and Wildlife Service, Fort Collins, Colorado.
1987-1988 Computer Aide, TGS Technology on contract to the U.S. Fish and Wildlife Service, Fort Collins, Colorado.

Education:	School	Degree and Date Received
	Michigan State University East Lansing, MI	B.S. Fish and Wildlife Biology, 1983
	Colorado State University Fort Collins, CO	M.S. Fish and Wildlife Biology, 1987

Expertise: My primary areas of expertise include stream fish ecology and habitat restoration. I have conducted numerous studies on resident and anadromous species. I have done extensive investigations on the habitat requirements of stream fish species in large and small riverine systems. In addition, I am well versed in the application of the Endangered Species Act and development of critical habitat designation.

Publications and Reports (five most relevant)

Cummings, T.R. 1996. Wind River Steelhead Smolt Inventory. US Fish and Wildlife Service, Vancouver, WA.

Cummings, T.R. 1995. Wind River Steelhead Smolt Inventory. US Fish and Wildlife Service, Vancouver, WA.

Cummings, T.R. 1994. Wind River Fishery Stewardship. Annual Progress Report. US Fish and Wildlife Service, Vancouver, WA.

Cummings, T.R. 1992. Swan Falls Instream Flow Study. US Fish and Wildlife Service, Vancouver, WA.

Cummings, T.R. 1987. Brook trout competition with greenback cutthroat trout in Hidden Valley Creek, Colorado. M.S. Thesis, Colorado State University, Fort Collins.

Resume for: J. Gardner Johnston

Experience

1995-Present Watershed Coordinator, Underwood Conservation District, White Salmon, WA.
Current responsibilities: Facilitate Wind River Action Committee. Coordinate and implement water quality restoration projects. Conduct water quality monitoring.

1995 Volunteer, Northwest Service Academy/AmeriCorps, Trout Lake, WA.

1993-1994 Manager, Little Creek Outdoor Adventures, Chapel Hill, NC.

Education:	School	Degree and Date Received
	University of North Carolina, Chapel Hill	B.A. Biology, 1993

Expertise: My expertise includes implementing on-the-ground watershed restoration activities, supervising restoration work crews, organizing community volunteer events, facilitating diverse stakeholder groups, and conducting ambient water quality monitoring.

Publications and Reports

Johnston, G., et al. 1996. Sustainability in the White Salmon River watershed. Pages 231-234 *in* Project Management Institute 1996 Proceedings, Boston, MA.

Resume for: James H. Petersen

Experience

1995-Present	Research Fishery Biologist, U.S. Geological Survey, Biological Resources Division, Columbia River Research Laboratory, Cook, WA. Current responsibilities: Project leader on research project to determine survival of summer steelhead over their first winter in the Wind River Basin (WA). Co-leader on various mainstem Columbia and Snake River projects concerning juvenile salmon passage, predation, and reservoir drawdown.
1994	Acting Director, Columbia River Research Laboratory, USGS, Cook, WA.
1988-93	Research Fishery Biologist, Columbia River Research Laboratory, U.S. Fish and Wildlife Service.
1984-88	Associate Research Curator, Section of Fishes, Natural History Museum of Los Angeles County, Los Angeles, CA.
1983-84	Environmental Scientist, Section of Fishes, Natural History Museum of Los Angeles County.
1977-83	Graduate Teaching Assistant, University of Oregon, Eugene, OR.

Education:	School	Degree and Date Received
	University of Oregon, Eugene	Ph.D., Marine Ecology, 1983
	University of Queensland, Australia	Rotary Fellowship, 1976
	Boise State University, Boise	B.S., Biology, 1975

Expertise: The primary areas of my expertise include predator-prey dynamics, population dynamics, and application of various modeling techniques to fisheries.

Publications and Reports (five most relevant)

Petersen, J.H. 1994. The importance of spatial pattern in estimating predation on juvenile salmonids in the Columbia River. Trans. Am. Fish. Soc. 123:924-930.

Petersen, J.H. and D.M. Gadomski. 1994. Light-mediated predation by northern squawfish on juvenile salmon. J. Fish Biol. 45: 227-242.

Petersen, J H., D.M. Gadomski, and T.P. Poe. 1994. Differential predation by northern squawfish on live and dead juvenile salmonids in the Bonneville Dam tailrace (Columbia River). Can. J. Fish. Aquat. Sci. 51:1197-1204.

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Resume for: Daniel J. Rawding

Experience

1995--Present Fish Biologist, Washington Dept. of Fish and Wildlife, Southwest Region, Vancouver, WA.
Current Responsibilities: As the agency's steelhead and sea-run cutthroat stock assessment and harvest specialist I am currently responsible for development of adult and juvenile population estimates from the mouth of the Columbia to the Klickitat River, development and implementation of recovery plans for all Lower Columbia River tributaries and reintroduction plans for the Cowlitz and White Salmon rivers, and development and implementation of mainstem and tributary harvest regulations.

1994 District Fish Biologist, Wa. Dept. of Fish and Wildlife, Region 5, Vancouver, WA.
1989-1993 Fish Biologist, Wa. Dept. of Fish and Wildlife, Steelhead Program, Olympia, WA.
1986-1988 Fish Biologist, U.S. Army Corps of Engineers, Cascade Locks, OR.
1983-1986 Fish Biologist, Wa. Dept. of Fish and Wildlife, Steelhead Program, Forks, WA.
1982-1984 Fishing Guide, Royal Coachman Lodge, Dillingham AK.
1984 Fisheries Technician, Wa. Dept. of Nat. Resources, Fish Program, Forks, WA.
1981 Fisheries Technician, U.S. Forest Service, Tongass National Forest, Sitka, AK.

Education:	School	Degree and Date Received
	University of Washington	B.S. Fishery Science, 1982

Expertise: The primary area of my expertise is steelhead and sea-run cutthroat biology and management including population dynamics, life history, stream ecology, stock assessment, and harvest management.

Publications and Reports (five most relevant)

Rawding, D.J. 1997. Stock status update for steelhead in the lower Columbia River, Washington. Washington Department of Fish and Wildlife. Olympia, WA.

Hale, D.A, and D.J. Rawding. 1997. Columbia River Fish Management Plan -- Winter steelhead, all species review . Washington Department of Fish and Wildlife. Olympia, WA.

Rawding, D.J. 1997. Wind River smolt monitoring report. Washington Department of Fish and Wildlife, Southwest Washington Region, Vancouver, WA.

Hale, D.A., and D.J. Rawding. 1997. Annual anadromous gamefish report. Washington Department of Fish and Wildlife. Vancouver, WA.

Rawding, D.J., and D.A. Hale. 1996. Annual anadromous gamefish report. Washington Department of Fish and Wildlife. Vancouver, WA.

Resume for: Susan C. Shaw

Experience

1996-Present	Acting Watershed Analysis Program Manager, Wash. Department of Natural Resources (DNR), Forest Practices Division, Olympia, WA. Current responsibilities: Manage the Wash. Forest Practices Board watershed-analysis program, supervise scientific and technical staff, coordinate program development with Timber/Fish/Wildlife caucuses, coordinate and conduct watershed-analysis training.
1994-1996	Geomorphologist, DNR, Watershed Analysis Program, Olympia, WA.
1991-1994	Geomorphologist, DNR, Olympic Region, Forks, WA.
1984-1991	Graduate Research Assistant, University of Washington, Seattle, WA.
1983-1984	Resource Management Technician, North Cascades NP, Sedro Woolley, WA.

Education:	School	Degree and Date Received
	University of Washington, Seattle	Ph.D., Geological Sciences, 1994
	University of Washington, Seattle	M.S., Geological Sciences, 1987
	Oberlin College, Oberlin, OH.	A.B., Geology, 1981

Expertise: My primary expertise includes river and hillslope geomorphology, mechanics of sediment transport and sediment-transporting flows, environmental geology, bedload-transport theory and field evaluation, slope stability analysis, and surface hydrology. I also have experience in soil rehabilitation, channel and riparian restoration, revegetation (directed a program for the National Park Service), watershed analysis on state/private lands, remote sensing, GIS.

Publications and Reports (five most relevant)

Washington Dept. Natural Resources. 1997. Habitat Conservation Plan. One of several principal authors; wrote sections on riparian and aquatic habitat conservation for the Olympic Experimental State Forest.

Shaw, S.C., and D.H. Johnson. 1995. Slope morphology model derived from digital elevation data. NW Arc/Info Users Conf. Proc., Coeur d'Alene, ID., Oct. 1995, 12 pp.

McHenry, M.L., S.C. Shaw, et al. 1995. Assessment of physical and biological conditions within the Deep Creek watershed, northern Olympic Peninsula, Washington: Historic relationships between fish habitat and mass-wasting processes, and recommendations for watershed restoration. Report prepared for Wash. DOE, Olympia, and Lower Elwha Fisheries, Port Angeles, WA.

Shaw, S.C. 1994. Bedload transport of mixed-size sediments. Ph.D. thesis, Univ. WA, Seattle.

Shaw, S.C. 1993. Implementing a watershed-analysis-based approach to timber management planning in the Hoh River Basin, western Olympic Peninsula, Washington. Proc. Watershed '93 Conf., March 1993, Alexandria, VA., p. 719-727.

Resume for: Steve Stampfli

Experience

1988-Present Manager, Underwood Conservation District, White Salmon, WA.
Current responsibilities: Guide functions of the district including office management, technical assistance to private landowners and governments on natural resource topics, grant writing and administration, and managing on-ground projects.

1984-1987 Environmental Coordinator, Wharf Resources Inc. Annie Creek Mine, Lead, SD.

1981-1984 Director, SD Department of Water and Natural Resources – Exploration and Mining Program, Pierre, SD.

1980-1981 Mine Reclamation Specialist, SD Department of Water and Natural Resources, Pierre, SD.

Education:	School	Degree Received
	Duke University, Durham, NC	Masters of Environmental Management
	Colorado College, Colorado Springs, CO	B.A., Biology

Expertise: Prime topics of expertise include watershed management methodology, disturbed land restoration, environmental monitoring and coordination of various governments and private interests.

Publications and Reports (five most relevant)

Stampfli, S. 1994a. White Salmon River watershed: basin land-use investigation report. Underwood Conservation District White Salmon, WA.

Stampfli, S. 1994b. White Salmon River watershed: basin water quality investigation report. Underwood Conservation District, White Salmon, WA.

Stampfli, S. 1992. Restoration of steep slopes adjacent to roadways in south central Washington. Underwood Conservation District, White Salmon, WA.

Stampfli, S. 1989. Water quality survey of Underwood Conservation District, Skamania and Klickitat Counties, WA. Underwood Conservation District, White Salmon, WA.

Ring, C., S. Stampfli, and B. Parish. 1986. Broad-winged hawk nesting in the Black Hills of South Dakota. South Dakota Bird Notes. Volume 6, Rapid City, SD.

Resume for: Kenneth Wieman

Experience

1993-Present	Fisheries Program Manager, USDA Forest Service, Wind River Ranger District, Carson, WA. Current Responsibilities: Represent Forest Service serving on the Wind River Restoration Team. South zone fisheries program manager responsible for developing fisheries stream restoration activities. Project leader on restoration project to evaluate and improve fish passage at Hemlock Dam. Conduct watershed analysis and environmental documentation for proposed forest management and land development activities.
1990-1993	Assistant district fisheries biologist, USDA Forest Service, Wind River Ranger District, Carson, WA.
1989-1990	Wildlife Biologist USDA Forest Service, Mount Saint Helens National Volcanic Monument, Amboy, WA.
1987-1990	Biological Technician USDA Forest Service, Mount Saint Helens National Volcanic Monument, Amboy, WA.
1986-1987	Student Conservation Association volunteer, Ridgefield National Wildlife Refuge, Ridgefield, WA.

Expertise: My primary areas of expertise and interest are in stream ecology, habitat evaluation and steam restoration. I have designed and implemented a number of stream monitoring and evaluation activities. I have gained considerable fish program management experience including contracting, budgeting supervision and interagency coordination.

Education:	School	Degree and Date Received
	University of Wisconsin-Madison,	B.S. Biological Aspects of Conservation, 1986 B.S. Physical Geography, 1986

Publications and Reports (five most relevant)

Wieman, K. 1997. Restoration of adult fish passage at Hemlock Dam - completion report. US Forest Service, Wind River District, Carson, WA.

Wieman, K, and N. Adams. (in progress). An evaluation of Hemlock Dam smolt passage. US Forest Service, Wind River District, Carson, WA.

Roper, B., and Wieman, K. (submitted for publication). Durability of Pacific Northwest instream structures following flood of a five - year or greater return interval

Conklin, C., and Wieman, K. 1990. A paired watershed assessment of Canyon Creek and Siouxon Creek. Report prepared for the Siouxon environmental impact statement. US Forest Service, Wind River District, Carson, WA.

Wieman, K. 1987. The biological response of aquatic macro-invertebrates to Reed's canary grass management at Ridgefield National Wildlife Refuge.

Section 10. Information/technology transfer

Despite recent improvements in information exchange and communication between watershed managers and scientists, there remains a critical missing link in communication on the local level, especially for species-specific restoration strategies. Our objective will be to present project findings, techniques, successes, and failures to regional watershed managers and scientists. At least one article describing experience gained from our efforts will be submitted to magazines and/or newsletters (e.g., EPA WaterTalk, Land and Water, Fisheries). In addition, project descriptions and findings will be presented at no less than two regional watershed conferences or workshops. Water quality data will be submitted to WDOE for 303d evaluation. Data will also be made available to regional and national databases such as the USFS's "wqdat" and "hydrostoret" databases.

We will host a Lower Columbia Steelhead Conservation Workshop. Residents in the lower Columbia River basin will be targeted for participation. Topics will include facilitation of stakeholder groups, watershed assessment, monitoring and evaluation, education, and restoration techniques.